Flytec Element

User manual

Version 1.0 March 2015

www.flytec.ch

Flytec

Thank you for flying with a Flytec vario. We are proud to present the Element, an ideal choice for any pilot who values accuracy and simplicity. All the information you need to familiarise yourself with the instrument can be found in the Quick Guide included with your vario, and we recommend you start there before digging into the Element User Manual.

About Flytec

For over 30 years Flytec has taken pride in developing flight instruments of the highest quality. We draw our inspiration from some of the world's most beautiful flying sites near our home in the heart of Switzerland, where we design and test our products.

Made by pilots, for pilots–it's as simple as that.

Stay in touch! Sign up for our newsletter to stay informed of product updates and other useful information:
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Table of Contents

Instrument overview 3

Getting started 6

In-flight information 10

Navigation 18

Airspace 24

Competition flying 25

Adjustments and customisation 27

Data management 31

Firmware updates 33

Technical notes and support 35

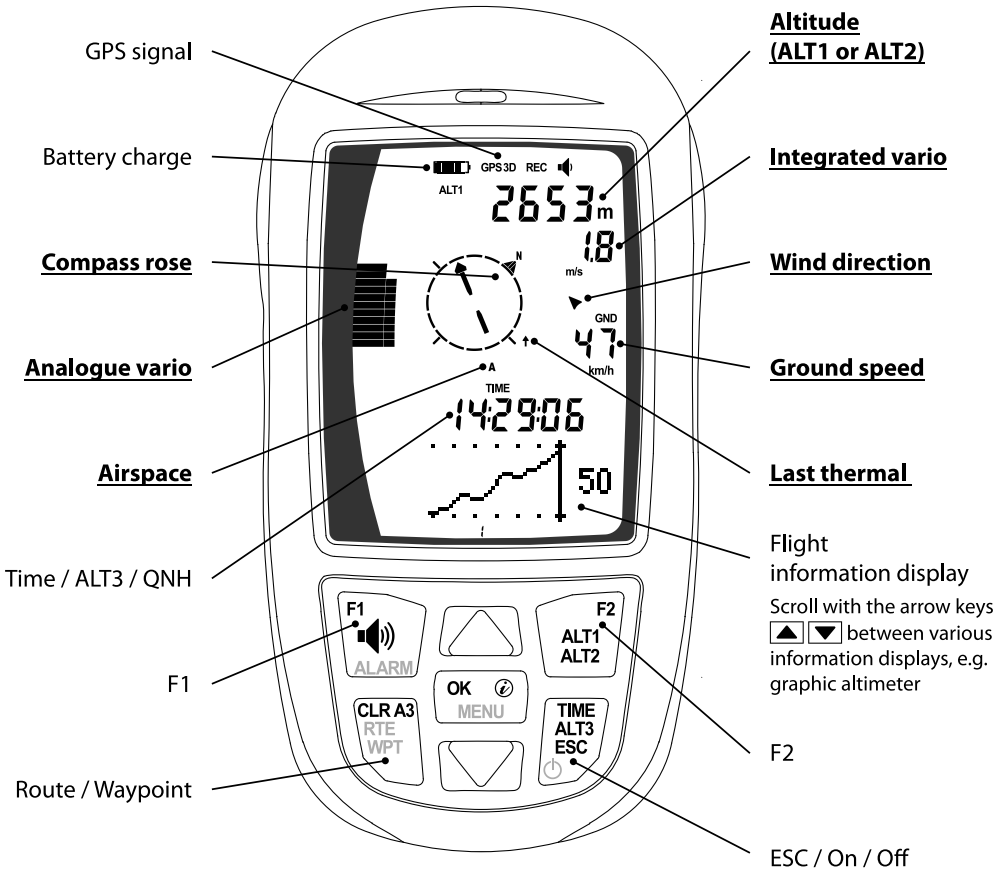
Specifications 37

Instrument overview

In this section:

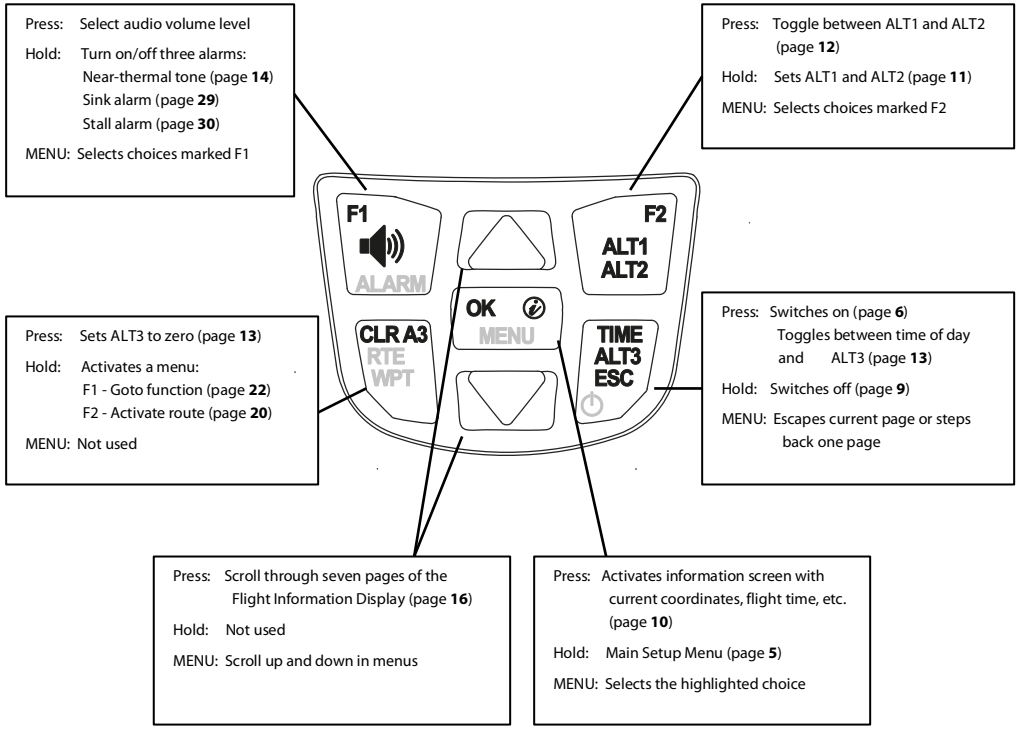
Element Diagram	3
Keypad Diagram	4
Text Entry	4
Menu Diagram	5

Element Diagram



Keypad Diagram

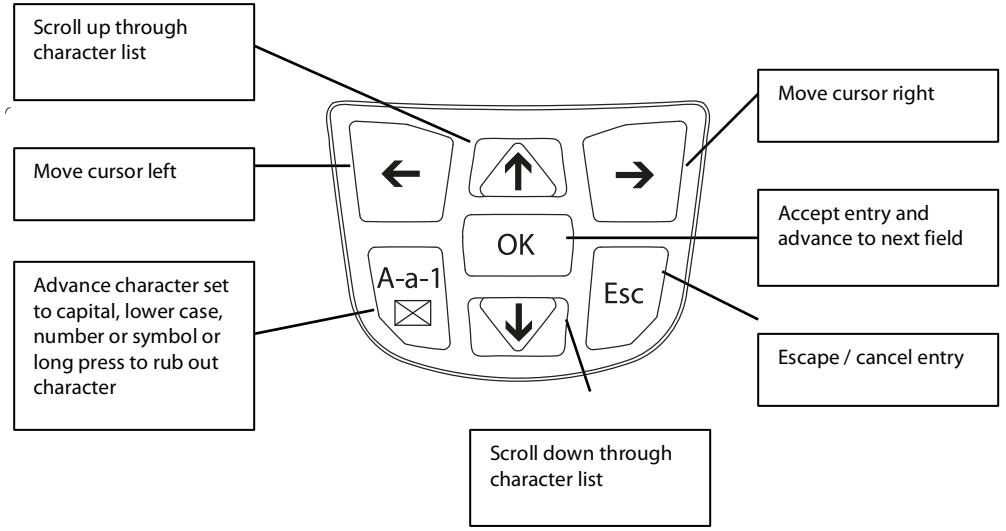
The Element's keys serve different functions depending on when and for how long you press them. The keys have a short **press** function (white lettering) and a longer, 3-second **hold** function (dark lettering). The keys also help you navigate through the Element menu.


Press: Select audio volume level
Hold: Turn on/off three alarms:
Near-thermal tone (page 14)
Sink alarm (page 29)
Stall alarm (page 30)
MENU: Selects choices marked F1
Press: Toggle between ALT1 and ALT2 (page 12)
Hold: Sets ALT1 and ALT2 (page 11)
MENU: Selects choices marked F2
F1
ALARM
F2
ALT1
ALT2
OK
MENU
CLR A3
RTE
WPT
TIME
ALT3
ESC
Press: Sets ALT3 to zero (page 13)
Hold: Activates a menu:
F1 - Goto function (page 22)
F2 - Activate route (page 20)
MENU: Not used
Press: Switches on (page 6)
Toggles between time of day and ALT3 (page 13)
Hold: Switches off (page 9)
MENU: Escapes current page or steps back one page
Press: Scroll through seven pages of the Flight Information Display (page 16)
Hold: Not used
MENU: Scroll up and down in menus
Press: Activates information screen with current coordinates, flight time, etc. (page 10)
Hold: Main Setup Menu (page 5)
MENU: Selects the highlighted choice

Text Entry

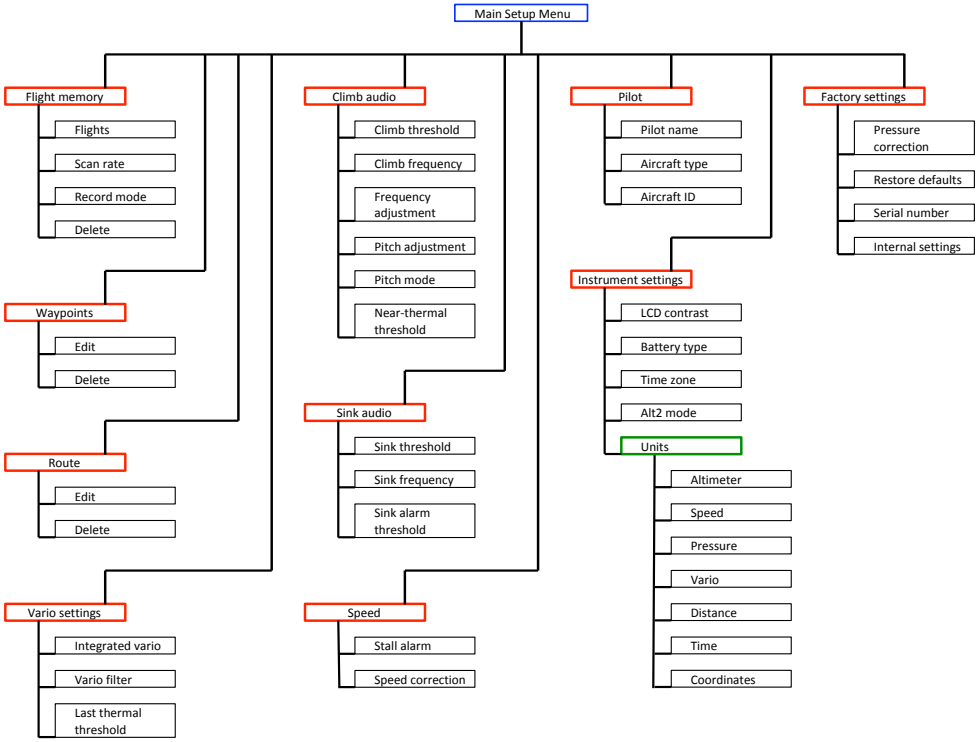
When entering data, it may be helpful to visualize the Element's keys as being labelled differently. Here is a guide to how the keys function when in text entry mode.

Key pad functions while editing waypoints


Scroll up through character list
Move cursor right
Move cursor left
Accept entry and advance to next field
Advance character set to capital, lower case, number or symbol or long press to rub out character
OK
A-a-1
Esc
Escape / cancel entry
Scroll down through character list

Menu Diagram

Access the Element's Main Setup Menu by pressing and holding **MENU** for 3 seconds. Then use the arrow keys ▲▼ and **OK** to navigate forward and **ESC** to step back through the menu tree.



Getting started

In this section:

Switching on	6
GPS acquisition	6
Setting time zone	6
Choosing units	6
Mounting	6
Detecting take-off	9
Recording flight data	9
Switching off	9

Switching on

The Element comes with two AA alkaline batteries with which the device will operate for about 30 hours.

Press the On/Off key ⏻.

Confirm **On?** by pressing **OK**.

GPS acquisition

Give your Element at least 2 minutes with an unobstructed view of the sky to acquire a GPS signal. **GPS 3D** will appear at the top of the display screen when the device receives sufficient satellite reception. The Element will automatically calibrate its clock and GPS altimeter. Battery charge state is also indicated.

Warning: Your radio and mobile phone will interfere with GPS reception, so keep them away from your Element.

Setting time zone

Time and date are automatically set by GPS, but you must input your time zone. See page **27** for instructions on selecting your UTC offset.

Choosing units

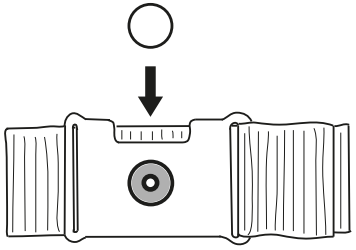
The Element's default is to use SI units (metric). See page **28** for instructions on how to change your Element's units of measurement.

Mounting

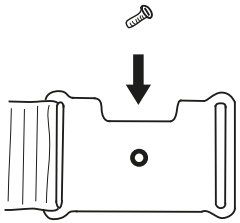
There are three paraglider mounting options available for the Element, shown on the following pages. A control bar mount for hang gliders is also available.

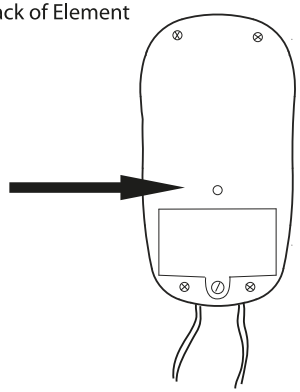
Leg strap mount

Front: insert rubber washer

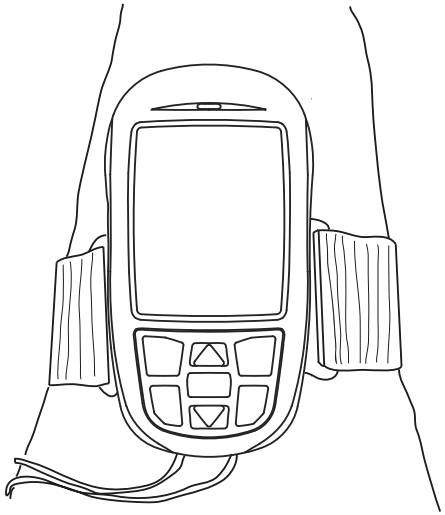


Back: insert screw, attach to back of Element



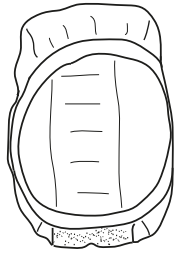


Attach strap to leg

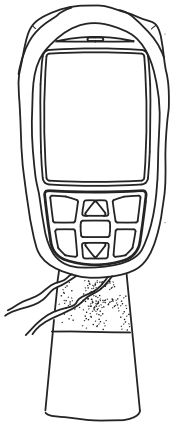


Fix Element's lanyard to harness

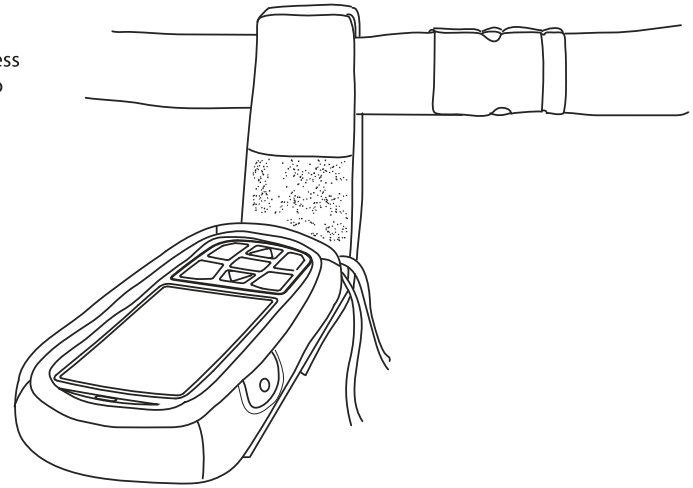
Harness mount



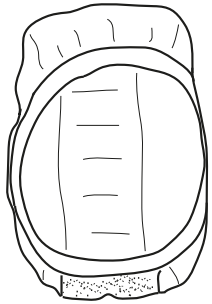
Insert the Element into the vario pocket, attach to the velcro bar

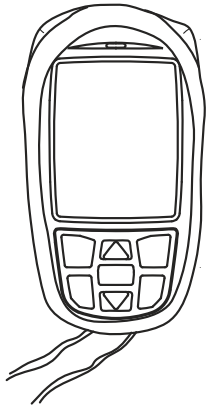


Attach the velcro bar to your harness and securethe Element's lanyard to harness or velcro bar

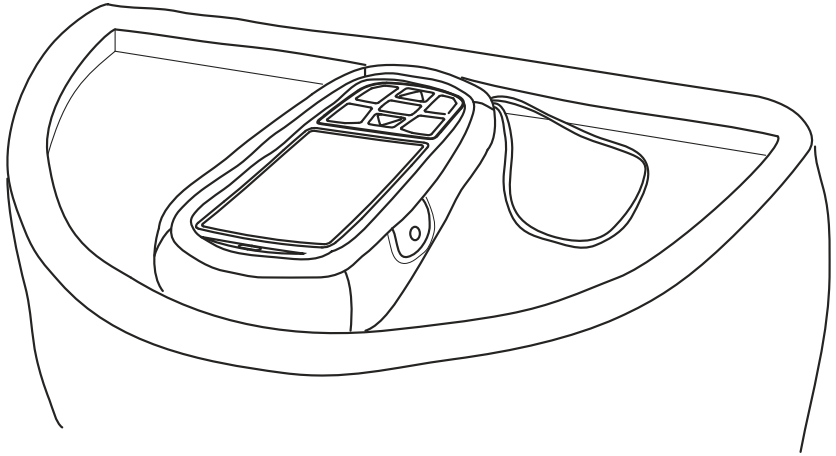


Cockpit mount





Insert the Element into the vario pocket, attach your cockpit and secure the Element's lanyard to the cockpit



Detecting take-off

The Element is programmed to automatically detect your take-off. Launch detection is enabled as soon as **GPS 3D** has appeared. Your Element will know the moment you begin flying.

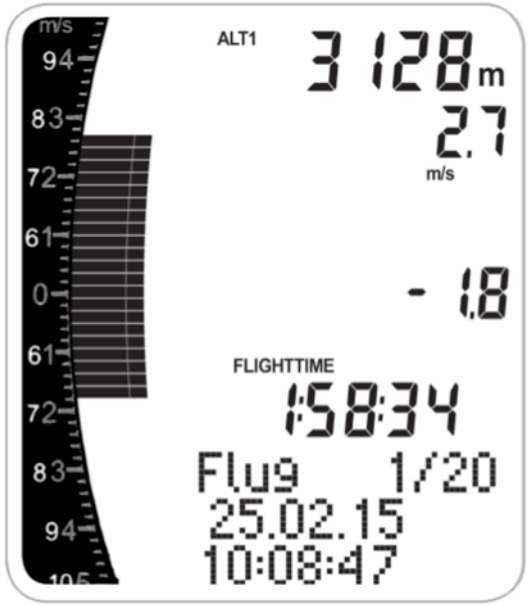
Recording flight data

The symbol **REC** will appear at the top of the display screen when your Element is recording flight data. It saves all the data from your flight, and it will only stop recording when it detects your landing or if you switch off your Element.

Note that upon landing, your Element will need a few seconds to determine for sure that you've stopped moving. Once it has, it will display a summary of your flight. While the flight summary is displayed, press ⏻ to switch off your Element.

Flight summary page:

- Maximum value of ALT1
- Maximum climb rate of the flight
- Maximum sink rate of the flight
- Total flight time
- Position in Element's memory (most recent flight is always #1)
- Date
- Time of take-off



Switching off

Switch off your Element at any time by holding down the On/Off key ⏻ and then confirming the prompt by pressing **OK**.

Press and hold ⏻.

Confirm **Off?** by pressing **OK**.

The Element will also wait for you to switch off once it detects your landing. Switch off by pressing ⏻ while the flight summary page is displayed.

If it is left idle, your Element will switch itself off after 5 minutes to preserve battery life.

In-flight information

In this section:

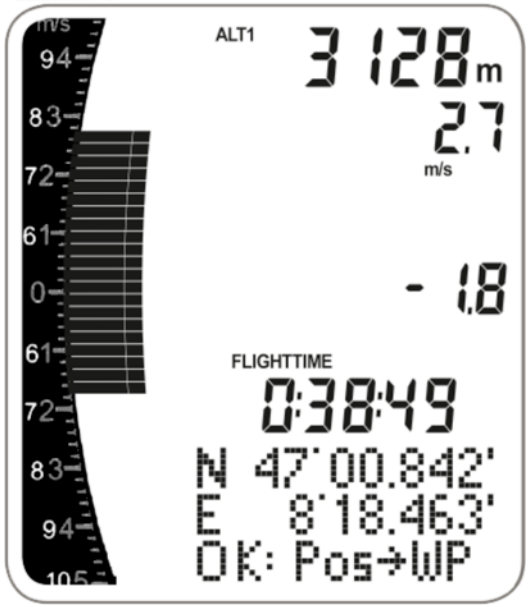
Info key	10
Altimeters	10
ALT1: Absolute altitude	11
ALT2: Alternative altitude display	12
ALT3: Relative altitude	13
Variometers	13
Vario acoustics	13
Graphic vario	14
Numeric vario	14
Near-thermal tone	14
Sink tone	14
Sink alarm	14
Direction of flight	15
Wind direction and strength	15
Relocating thermals	15
Compass rose and wind arrow	15
Flight Information Display pages	16

Info key ⓘ

Pressing the Info key ⓘ at any time in flight will display a useful information page. After 20 seconds the screen will return to normal, or you can immediately return to the normal display by pressing **ESC**.

Information Page:

- Maximum value of ALT1
- Maximum climb rate of the current flight
- Maximum sink rate of the current flight
- Elapsed flight time
- Current GPS coordinates
- Save current position (see page **20**)



Altimeters

As any pilot knows, there are many different altitudes in aviation. The Element determines altitude using both GPS and barometric pressure, and its altitude display is customisable. You can select among three altimeters called ALT1, ALT2, and ALT3, and you can manually set the sea level barometric pressure.

We will use the following definitions when explaining the altimeter functions:

- **Absolute altitude** – height above mean sea level (MSL)
- **GPS altitude** – MSL altitude indicated by GPS satellites
- **Relative altitude** – height above a known point such as an airfield
- **AGL Altitude** – height over the terrain directly below (above ground level)
- **QNH** – the actual air pressure at sea level
- **Flight Level**– altitude MSL, in hundred feet intervals, relative to the ISA pressure setting of 1013.25 hPa. FL17, for example, indicates that you are in the 1700' band, between 1650' and 1750' MSL.

ALT1: Absolute altitude

ALT1 is your altitude above Mean Sea Level (MSL). Toggle between displaying ALT1 and ALT2 (see page **12**) by pressing **ALT1 / ALT2**.

ALT1 is automatically set to your GPS altitude as soon as the Element acquires a GPS signal. (Note that ALT1 flashes until the Element has calculated a precise reading.) This altitude calibration means, of course, that the QNH pressure setting is also automatically adjusted.

You can manually adjust ALT1 by holding down **ALT1**, which brings you into the ALT1 setting screen. There are three main reasons you might choose to adjust ALT1:

1. If you DO know your present altitude, but you DO NOT know your QNH setting.

For instance, you notice a sign posted at the take-off giving the actual MSL elevation of the ramp. In this case, you might adjust your ALT1 to match the sign. You will notice that adjusting the altitude setting will also cause a change the QNH pressure setting.

Press and hold **ALT1**.

Use ▲▼ to adjust ALT1 to the desired reading.

Press **OK**.

2. If you DO NOT know your present altitude, but you DO know your barometric pressure.

Perhaps you have an aviation weather report giving the local QNH setting, or perhaps you have a setting from air traffic control. In either case you can change ALT1 to reflect this pressure setting.

Press and hold **ALT1**.

Use ▲▼ to adjust ALT1 until QNH matches the desired reading.

Press **OK**.

3. If you want to cancel an adjustment and return to either standard pressure setting or GPS altitude.

The **F1** and **F2** keys will allow you to quickly cancel any ALT1 adjustments and use a standard setting.

Press and hold **ALT1**.

Press **F1** to confirm the choice to set ALT1 to **FL-Alt**, MSL using standard atmospheric pressure.

OR

Press **F2** to confirm the choice to set ALT1 to GPS altitude.

Press **OK**.

ALT2: Alternative altitude display

Toggle between displaying ALT1 and ALT2 by pressing **ALT1 / ALT2**. When ALT2 is toggled, your Element will not necessarily display the label ALT2, instead it will indicate whichever ALT2 configuration is presently selected. You can configure ALT2 to show any of four different values using the Instrument Settings menu.

Press and hold **MENU**, then use ▲▼ to select **Instrument settings**.

Press **OK**.

Use ▲▼ to select **Alt2 mode** and press **OK**.

Use ▲▼ to select your preferred ALT2 mode.

Press **OK**.

Press **ESC** to return to the Main Setup Menu.

These are the four available choices for ALT2:

- **GPS altitude**
  (The label **GPS** *appears beside the altitude reading.)*
  Note that you cannot adjust ALT2 when you have selected this option. ALT2 will only display the current GPS altitude.

- **Flight Level**
  (The label **FL** *appears beside the altitude reading.)*
  Note that you cannot adjust ALT2 when you have selected this option, because the Flight Level display is always based on a standard atmospheric pressure value of 1013.25 hPa.

- **ALT1 m/ft inverse**
  (If ALT1 is displayed in metres, then ALT2 displays true altitude in feet. The label ALT1 remains beside the altitude reading but the units change.)
  Note that you can adjust this value. Adjusting ALT2 in this mode will automatically adjust ALT1 as well.

- **Relative altimeter**
  (The label **ALT2** appears beside the altitude reading.
  Note that you can adjust this value.

These are the available adjustments for ALT2:

1. When in relative altimeter mode, you can rapidly reset the ALT2 relative altimeter to either your current GPS altitude or to zero by holding down the* ALT2 *key.

Press and hold **ALT2**.

Press **F1** to set the relative altimeter ALT2 to 0.

OR

Press **F2** to set the relative altimeter ALT2 to your current GPS altitude.

Press **OK.**

2. When in relative altimeter mode, you can adjust the ALT2 relative altimeter up or down using the arrow keys ▲▼.

Press and hold **ALT2**.

Use ▲▼ to set the relative altimeter ALT2 to your desired value.

Press **OK.**

3. When in ALT1 m/ft inverse mode, you can adjust ALT2 up or down using the arrow keys ▲▼. This automatically adjusts ALT1.

Press and hold **ALT2**.

Use ▲▼ to set the ALT1 m/ft inverse altimeter ALT2 to your desired value.

Press **OK.**

ALT3: Relative altitude

Toggle between displaying ALT3 and the current time of day by pressing the **ALT3** key. This altimeter always gives a relative altitude and is easy to reset to zero in flight using the Clear ALT3 **CLR A3** key. It has two main uses:

1. When your Element detects take-off, it automatically sets ALT3 to zero. In this way, ALT3 will indicate your height above (or below) the launch.

2. In flight, reset ALT3 to zero at any time by pressing **CLR A3**. This can be useful to monitor your height gain in a weak thermal.

Variometers

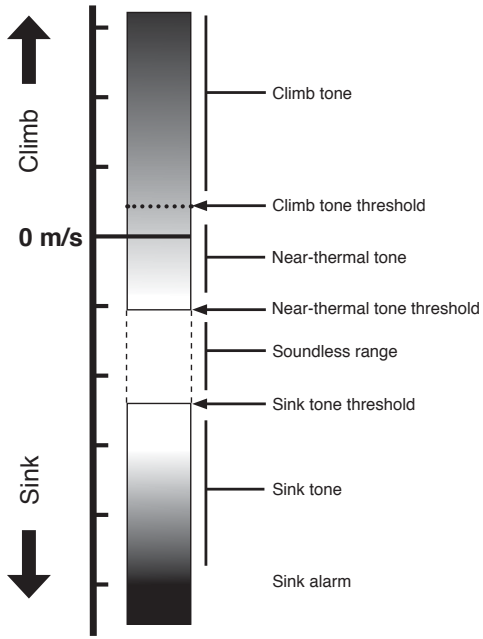
The Element has acoustic vario tones and two vario displays: one graphic and one numeric vario. Vario acoustics reflect the values of the graphic vario, not the numeric vario.

The Element's barometric pressure sensor is very sensitive and the vario default settings are designed to help you thermal optimally in normal conditions, so we recommend you do not change them for your first few flights with the Element. Later, if you wish to configure your vario settings, see page Error! Bookmark not defined..

Vario acoustics

Like most all varios, the Element beeps when you climb and sounds a low tone when you sink. But the vario acoustics are slightly more sophisticated than that.

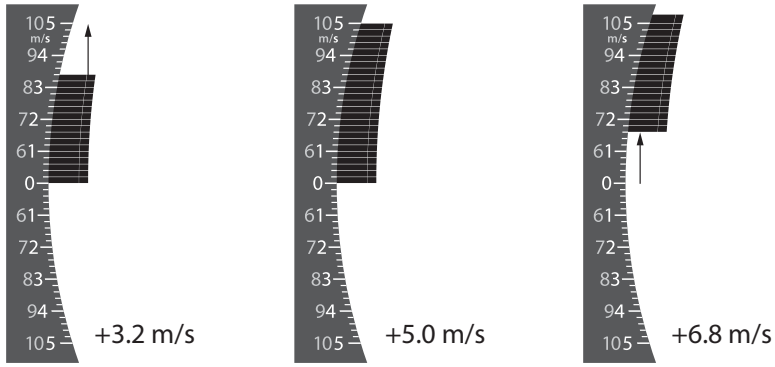
In addition to the familiar climb and sink tones, your Element also features a Near-thermal Tone to help you find weak thermals and it sounds a Sink Alarm if you are sinking rapidly. All vario tones are configurable under the Vario Settings Menu, discussed on page **28.** See page **29** for more information about setting and using the Sink Alarm.



Graphic vario

The graphic vario shows your vertical speed (climb or sink) in metres per second, ranging from +10 m/s to -10 m/s in 0.2 m/s increments. (You may also choose feet per minute, ranging from +20 fpm x100 to -20 fpm x100. See page **28** to change your vario display units.)

The black bar will extend upwards to indicate values from 0 m/s to 5.0 m/s, then begin receding upwards to indicate climbs greater than 5.0 m/s up to a maximum of 10.0 m/s. The graphic vario indicates sink in the same way.



Numeric vario

The numeric vario gives your vertical speed averaged over a time interval, displayed in increments of 0.1 m/s from 0 to +/-300 m/s, recalculated every second. The default setting averages the vario readings over the past 5 seconds. (See page Error! Bookmark not defined. to adjust this value.)

Near-thermal tone

When the Near-thermal Tone is activated, the symbol ◀^ appears in the upper right corner of the display. This function is useful when conditions are weak and you are searching for weak thermals with very slow climb rates that might not activate a climb tone. Turn on the Near-thermal Tone and you will hear an indication whenever the Element senses the slight sink indicating you are near a weak thermal. (See page **29** to adjust the Near-thermal Tone threshold.)

To activate or deactivate the Near-thermal Tone:

Press and hold **ALARM.**

Use ▲▼ to select **PreTherm**.

Confirm activating/deactivating the Near-thermal Tone by pressing **F1.**

Press **OK**.

Sink tone

The Sink Tone is a low, gradual tone telling you that you are losing altitude. The lower the tone, the higher your sink rate. (See page **29** to adjust the Sink Tone threshold.)

Sink alarm

The Sink Alarm is a continuous tone telling you that you are sinking rapidly. When activated, the symbol ◀v appears in the upper right corner of the display. (See page **29** to adjust the Sink Alarm threshold.)

To activate or deactivate the Sink Alarm:

Press and hold **ALARM.**

Use ▲▼ to select **Sink**.

Confirm activating/deactivating the Sink Alarm by pressing **F1.**

Press **OK**.

Direction of flight

The Element uses GPS to monitor your track over the ground, and it shows your direction of flight relative to north on the compass rose. Note that the Element does not use magnetic compass data and cannot display your heading, i.e., which way you are facing. The GPS compass only works when you are flying or otherwise moving over the earth at 3 km/h or faster.

Wind direction and strength

Wind direction is shown on the display as a small wind arrow beside the compass rose. When the arrow points up, you have a tailwind. When the arrow points down, you are flying into a headwind.

Wind speed is shown on Flight Information Display Page 3, which you can select at any time using the arrow keys ▲▼ (see page **16**.)

Note: The Element calculates wind direction and strength by measuring your track over the ground during 360-degree turns and calculating your drift. For the most accurate wind reading, you should fly two or more slow circles, holding constant speed and bank angle.

Relocating thermals

To help you in cross country flight, your Element will remember the location of the last thermal as you fly along your route. The bearing to your most recent thermal is displayed as a small ↑ arrow on the compass rose. If you fall out of a thermal, or if you are sinking out and want to return to the last thermal, turn your glider until the up arrow indicator appears at the top of the compass rose, then fly straight until you enter the thermal and begin climbing again.

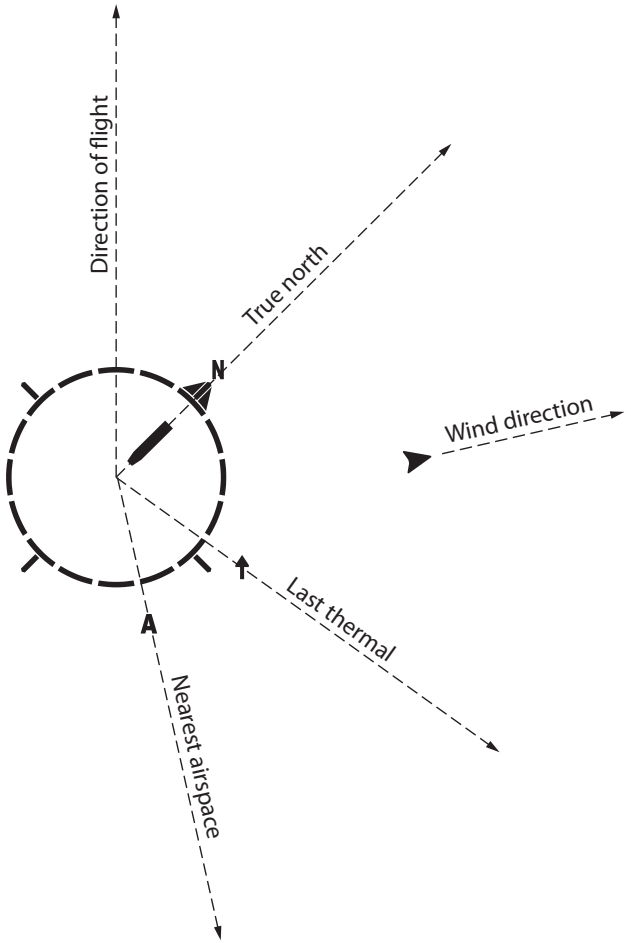
You should also use the arrow keys ▲▼ to select Flight Information Display Page 4, which will tell you the bearing and distance to your last thermal. This is shown on page **16**.

(See page Error! Bookmark not defined. to configure your Element's threshold for last thermal strength.)

TIP: You can also use the **Goto** function (see page **22**) to guide you to your last thermal, which will appear as **_Last ↑** in your waypoints list.

Compass rose and wind arrow

All icons on the compass rose indicate bearings relative to your direction of flight. Your direction of flight is always at the top of this display. The wind arrow appears off to the side.

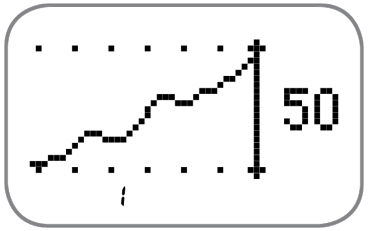


Flight Information Display pages

In flight, your Element has a lot more information than can be shown all at once on the display screen. Press ▲▼ to cycle through seven pages in the Flight Information Display field, which appears at the bottom of the display screen.

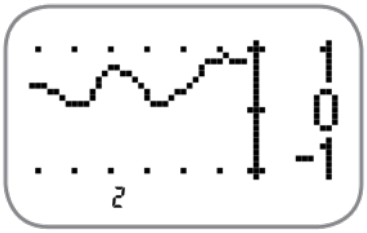
1. Altimeter graphics

This graph shows your altitude during the past 40 seconds. The y-axis will automatically scale itself from 50 m to 100 m (or from 200 ft to 400 ft) if you are climbing or sinking rapidly.



2. Variometer graphics

This graph shows your rate of climb or sink during the past 40 seconds. The y-axis will also scale itself depending on your vario readings.



3. Wind data

This page informs you about the Element's measurement of wind, which is calculated from your drift. For more information about this function as well as the wind arrow, see page **15**.

Actual track of your flight (0-360°)

Wind direction (0-360°)

Time since last calculation (in minutes)
Wind speed (km/h, kts, or mph, depending on your unit settings)

4. Navigation page

This page is a multifunction navigation tool that helps you fly to your intended target. Use this page when flying to the next waypoint in an active route (see page **20**) or when using the Goto function (see page **22**). You can also use this page to help return to the last thermal you climbed in (see page **15**).

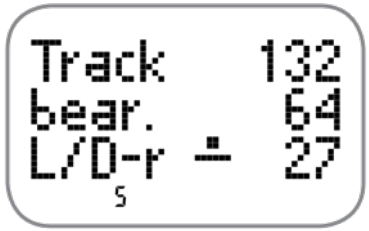
Name of active waypoint

Bearing to waypoint (0-360°)

Distance to waypoint (km or miles)

5. Active waypoint: direction and glide

While flying to a waypoint, use this page to determine whether or not you can reach your target with enough altitude to continue your flight. The page also shows your track and the required bearing to reach the waypoint.

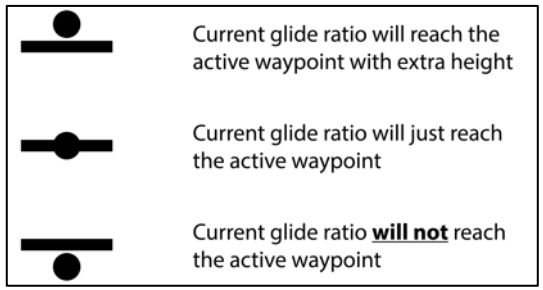


Actual track of your flight (0-360°)

Bearing to the waypoint (0-360°)

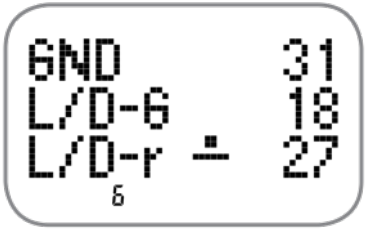
Glide ratio required to reach the waypoint

This page also gives a glide path symbol to help you quickly decide if you have enough height to reach the waypoint:


Current glide ratio will reach the active waypoint with extra height
Current glide ratio will just reach the active waypoint
Current glide ratio will not reach the active waypoint

6. Speed and glide

Use this page to help optimise your flight. Should you slow down to minimum sink? Should you use your speed bar? This page makes the decision easy.



Speed over ground (km/h, kts, or mph, depending on your unit settings)

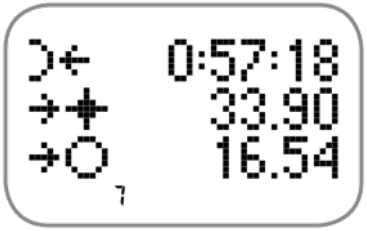
Glide ratio over ground

Glide ratio required to reach the active waponit

Note that the same glide path symbol from Flight Information Display Page 5 appears here on Page 6 also.

7. Competition data*

This screen is useful when flying competitions. See page **25** to learn more about how your Element can help you win races.



Position relative to cylinder, and +/- start time

Speed required to reach the cylinder edge at start time (before start time), or distance to goal (once started)

Distance to cylinder edge

*Note that this data field can only be selected when a route is activated.

Navigation

In this section:

Generating coordinates	18
Entering waypoints	19
Creating a route	19
Activating the route	20
Saving current position as a waypoint	20
Required glide to next waypoint	22
Passing over waypoints	22
Deviating from your route	22
Skipping or repeating waypoints	22
Goto function	22
Erasing the route	23
Erasing individual waypoints	23
Erasing all waypoints	23

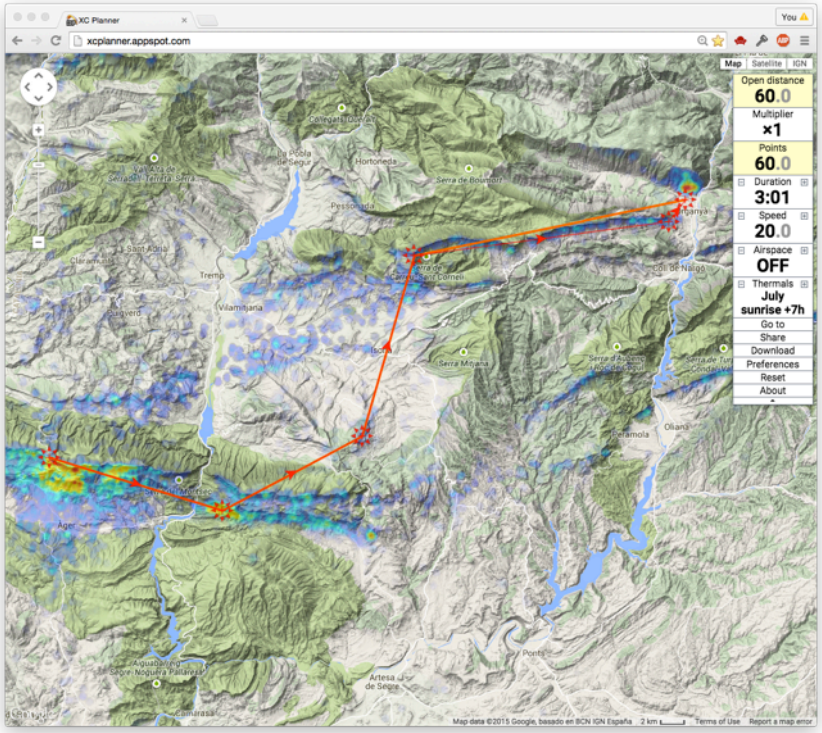
The Element is the perfect vario to get started with cross-country flying. Here is how you might go about planning and flying a flight using your Element.

Generating coordinates

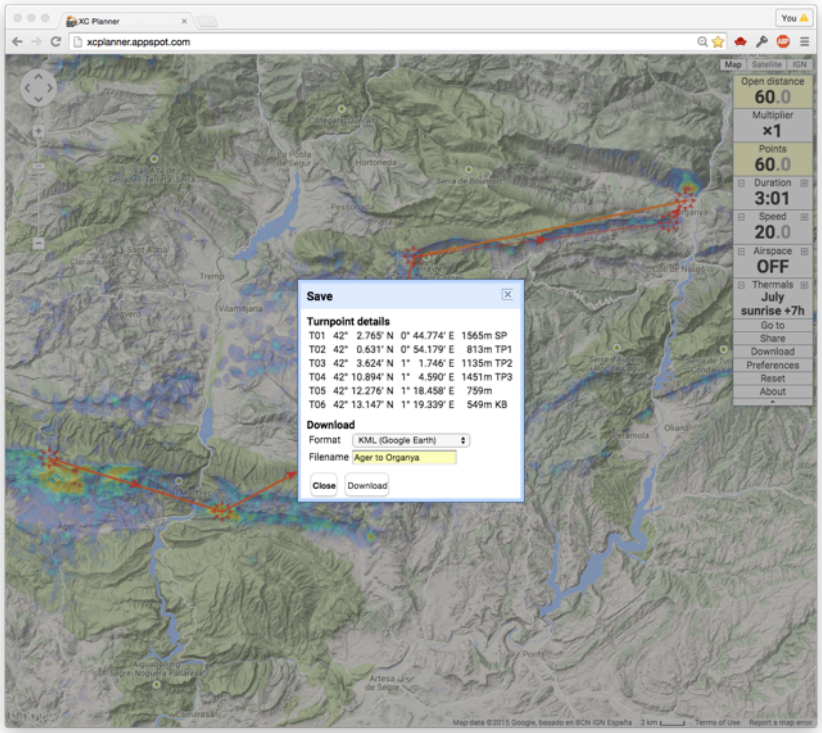
First, you will need navigation data. You can get this from your mentor or another pilot, or you can use mapping software to generate your own information. For this tutorial you will use XC Planner, a free online tool (www.xcplanner.appspot.com). You can also use Google Earth or similar software, or even a paper map if you want to do it the hard way.

Drag the red line to position waypoints on the map. In XC Planner, right-clicking creates a new waypoint (Control+click on a Mac). Grabbing and dragging the midpoint of the red line also creates a new waypoint.

Let's say you want to fly the classic route from Àger to Organyà, in Spain. You will drag the red line to connect likely thermal sources and soarable ridges along the route:



To generate coordinates for the waypoints along this route, click the box on the right, labelled **Download**.



Copy down the information. You can also save the waypoints as a WPT file by selecting the option **FormatGEO (GpsDump)** and clicking Download. In a future firmware update for the Element, you will be able to drag-and-drop this file directly into your Element. For now, you will enter the navigation information manually.

WP01	Ager take-off	N 42°02.765′	E 0°44.774′	1565 m
WP02	Vilanova de M	N 42°00.631′	E 0°54.179′	813 m
WP03	Knoll	N 42°03.624′	E 1°01.746′	1135 m
WP04	Ridge	N 42°10.894′	E 1°04.590′	1451 m
WP05	Santa Fe	N 42°12.276′	E 1°18.458′	759 m
WP06	Organya	N 42°13.147′	E 1°19.339′	549 m

Entering waypoints

Your Element stores locations as a list of **waypoints** which you may choose to navigate to individually and/or link together into a saved **route**. The Element has enough memory to record 250 waypoints, and a route may enchain up to 50 waypoints. Here is how to store locations in your Element as waypoints.

Note: see page **4** for a visual guide to help you with text entry.

Press and hold **MENU**, then use ▲▼ to select **Waypoints**. Press **OK**.

Use ▲▼ to select **Edit**. Press **OK**.

Press **F1** to create a new waypoint.

Spell out **Ager take-off** using ▲▼ to select the letters and **F1 / F2** to move back and forth. Use **RTE** to toggle capital letters and special characters. Holding down **RTE** will also delete a character. Press **OK** to move on to the next page.

Select **N** and enter **42° 2.765'** for the latitude. Press **OK**.

Select **E** and enter **00° 44.774'** for the longitude. Press **OK**.

Enter **1565 m** for the **Ager take-off** waypoint altitude. Press **OK**.

The waypoint named **Ager take-off** is now saved. Repeat this procedure to enter the other waypoints.

Press **ESC** to return to the Main Setup Menu.

Creating a route

To follow your planned cross country flight, you will need to create a route that tells the Element how you want to fly over the waypoints. Note that saving a route creates a file stored separately from the waypoint list already in the device's memory.

Press and hold **MENU**, then select **Route**. Press **OK**.

Select **Edit**. Press **OK**.

Press **F1** to open the list of waypoints. Use ▲▼ to highlight your first waypoint, in this case **Ager take-off**. Press **OK**.

Use ▲▼ to select the cylinder radius for the waypoint. We recommend the default value of **400 m**. Press **OK**.

Repeat these steps to add the other waypoints on the route.

Press **ESC** to save the route and return to the Main Setup Menu.

Activating the route

In order to tell the Element you are ready to fly the saved route, you must activate the route. This gives the Element the instruction to start navigating you along the chain of waypoints.

Note that you will be prompted to enter a start time for your route. For normal cross country navigation, simply select **No** for the start time. (Entering a start time for your route activates your Element's competition mode. See page **25** for information about flying competition routes.)

Press and hold **RTE**. Confirm **Route Start** by pressing **F2**.

You will see the prompt **Start time**. Use ▲▼ to select **No**. Press **OK**.

The route is now activated and your Element will start navigating automatically upon take-off.

Saving current position as a waypoint

There are two fast and easy ways to save your current coordinates to your waypoints list.

1. Simply create a new waypoint

Every time you create a waypoint, the Element offers you its current position as the default coordinates. You can instantly save your current position as a waypoint by simply using the **OK** key to confirm this default waypoint information. Your position will be stored as a new waypoint with a name comprised of two numbers that represent the date and time you created the waypoint:

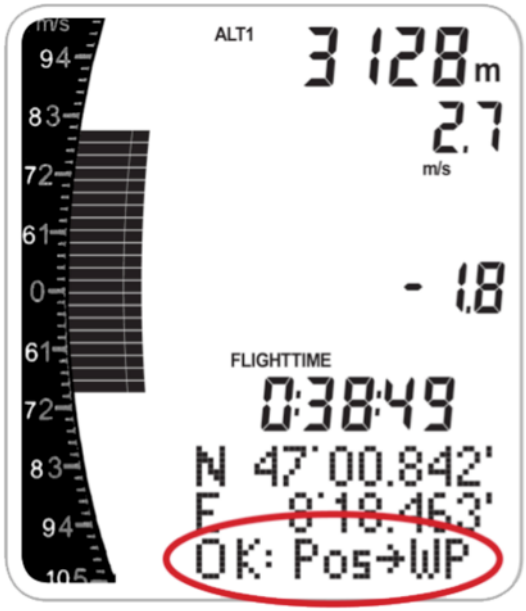
Ex: **220415 152845** is a waypoint created on 22 April 2015 at 15 h 28 min 45 s (local time).

2. Use the Info key ⓘ

When you call up the Info page by pressing ⓘ, you can then use **OK** to automatically save your current location to the waypoints list. The same format is used for the waypoint name.

Press ⓘ.

You will see the prompt **Pos→WP**. Press **OK**.

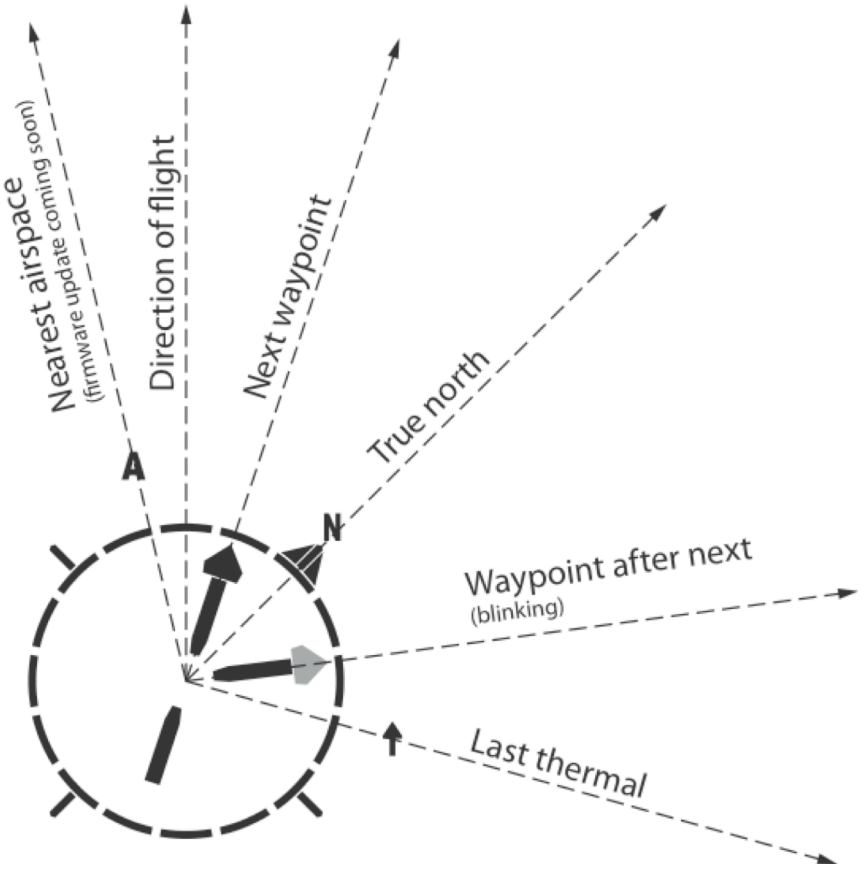


Flying a normal route

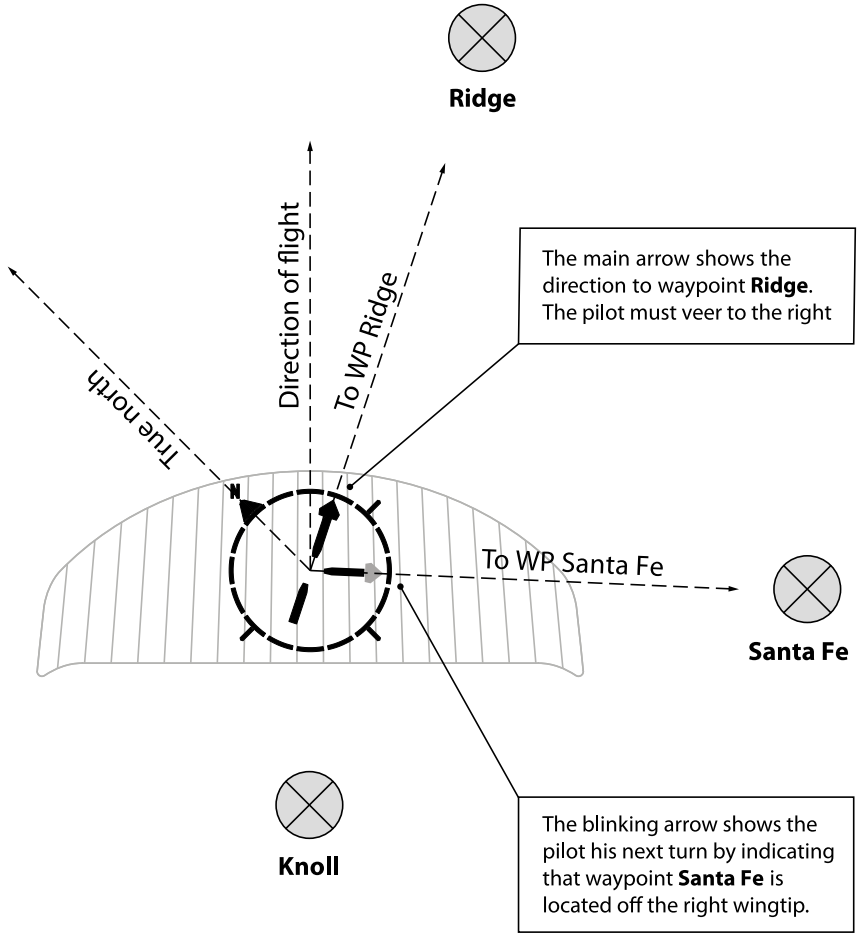
In flight, the Element will show you the direction to your next waypoint as a bold arrow appearing in the compass rose. To fly to the next waypoint on your route, turn your glider until this arrow stays pointed toward the top of the compass rose. Every time you cross a waypoint, your Element will sound a tone and begin pointing you toward the next waypoint.

Compass Rose

All icons on the compass rose indicate bearings relative to your direction of flight. Your direction of flight is always at the very top of this display

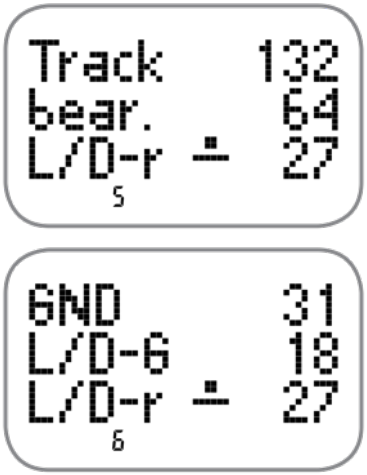


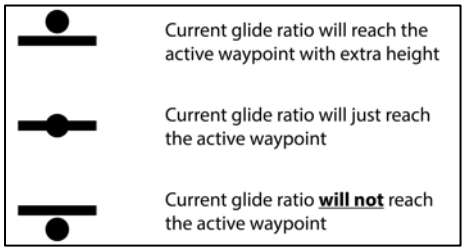
In the example flight, when you fly from **Ager take-off**, the device will automatically point the way to **Vilanova de M**. Once you pass over **Vilanova de M**, your Element will point you toward **Knoll**, and so on. Shown below, the pilot has passed **Knoll** and is heading toward **Ridge**, but the Element shows the glider is slightly off course. The Element also shows that our pilot's next turn will be to the right, to set a course for **Santa Fe**.


Ridge
Direction of flight
To WP Ridge
True north
N
The main arrow shows the direction to waypoint **Ridge**. The pilot must veer to the right
To WP Santa Fe
Santa Fe
Knoll
The blinking arrow shows the pilot his next turn by indicating that waypoint **Santa Fe** is located off the right wingtip.

Required glide to next waypoint

Use Flight Information Display Pages 5 and 6 to help you determine if you have enough altitude to reach your next waypoint when you set off on glide. Page 6 shows you your current glide ratio along with the required glide ratio to reach the next waypoint at the saved waypoint altitude. If your L/D ratio over ground is higher than L/D-required, accelerate with confidence! If you are under the required glide ratio, search for lift.




Current glide ratio will reach the active waypoint with extra height
Current glide ratio will just reach the active waypoint
Current glide ratio will not reach the active waypoint

(For more discussion of these displays, see page **16**.)

Passing over waypoints

The Element will sound a long, unmistakable tone when you cross a waypoint cylinder edge, and the compass rose will point you toward the next waypoint on your route.

Deviating from your route

You do not need to follow your route exactly as planned. It is easy to return to a previous waypoint on the route, or to skip a waypoint, or to interrupt your route and navigate to any other waypoint in your stored waypoints list.

Skipping or repeating waypoints

A useful option is to skip forward or backward within an active route. Imagine you just caught a rocketing thermal to over 3000 m at **Vilanova de M**, so you decide to skip **Knoll** and proceed straight to **Ridge** instead.

Press and hold **RTE**.

Use ▲▼ to select **Ridge**. Press **OK**.

You will now be guided to the waypoint you have selected. Once you reach it, the active route will continue from there. Use the same procedure to skip backwards to a previous waypoint in your route.

Goto function

Navigate to any stored waypoint at any time using the **Goto** function. Imagine you have passed **Knoll** but you are losing too much altitude to continue on. You decide to navigate back to **Vilanova de M** for a safe landing field.

Press and hold **WPT**. Confirm **Goto** by pressing **F1**.

Use ▲▼ to select **Vilanova de M** Press **OK**.

The arrow in the compass rose will now point you to **Vilanova de M**. You can also easily cancel the **Goto** function.

Press and hold **WPT**. Confirm ☒ **Canc Goto** by pressing **F1**.

As long as you still have an active route, the Element will resume pointing you to the next waypoint along your route once you cancel the **Goto** function.

Deactivating the route

An activated route will remain in active mode until you deactivate it, even if you switch off your Element. You also cannot edit the route until you deactivate it.

Press and hold **RTE**. Confirm **Route** ☒ by pressing **F2**.

Erasing the route

Deleting the route will not erase the waypoints from your stored waypoints list, because they are stored separately.

Press and hold **MENU**, then use ▲▼ to select **Route**. Press **OK**.

Select **Del all WP**. Press **OK**.

You will see the prompt **Delete Route?** Press **OK**.

Erasing individual waypoints

You can also choose to erase waypoints from your Element's stored waypoints list. If the waypoints you delete are also part of a saved route, they will remain in the route.

Press and hold **MENU**, then use ▲▼ to select **Waypoints**. Press **OK**.

Select **Edit** and press **OK**.

Use ▲▼ to select **Ager take-off**.

Press **F2** to delete.

Your waypoint **Ager take-off** has been deleted.

Erasing all waypoints

Be careful with this feature! It is easy to erase all the waypoints from your Element.

Press and hold **MENU**, then use ▲▼ to select **Waypoints**. Press **OK**.

Select **Delete** and press **OK**.

Confirm **all WP Delete?** by pressing **OK.** Press **ESC** to cancel.

Airspace

(Coming soon!)

We will soon offer airspace support as a new navigation feature of the Flytec Element.

Please visit element.flytec.ch to check for the most current firmware version. Sign up for our newsletter at www.flytec.ch/nl to be notified of update releases.

Competition flying

In this section:

Creating a competition route	25
Activating a competition route	25
Starting the competition	26
Compass rose at competition start	26
Multiple start gates	26
Flying the competition	26
Final glide	26

Creating a competition route

Enter waypoints for your competition and store them as a route exactly as you would for normal cross country navigation.

Activating a competition route

When activating any route, enter the Element's competition mode by selecting **yes** at the prompt **Enter start time.**

Competitions often begin with an exit cylinder around a waypoint, and at the start time you must be flying inside the cylinder. When the start cylinder opens it is time to fly out and head off for the next waypoint. Some competitions do the opposite, specifying instead an enter cylinder which you must remain outside of until the start time. In that case, when the cylinder opens you must fly into it to begin the race.

Competitions may also specify several possible start times, called “gates”. If there are multiple start gates, they will be separated by regular intervals of a number of minutes.

Press and hold **RTE**. Confirm **Route Start** by pressing **F2**.

You will see the prompt **Start time**. Use ▲▼ to select **yes**. Press **OK**.

Use ▲▼ to enter the start time hours. Press **OK**.

Use ▲▼ to enter the start time minutes. Press **OK**.

Use ▲▼ to select the number of start gates. Press **OK**.

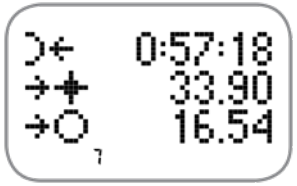
Use ▲▼ to select the start gate interval. Press **OK**.

Use ▲▼ to choose either EXIT cylinder ○→ or ENTER cylinder ○←

Press **OK**.

Starting the competition

Use the arrow keys ▲▼ to select Flight Information Display Page 7, which will tell you your position relative to the start cylinder as you wait for your start time.

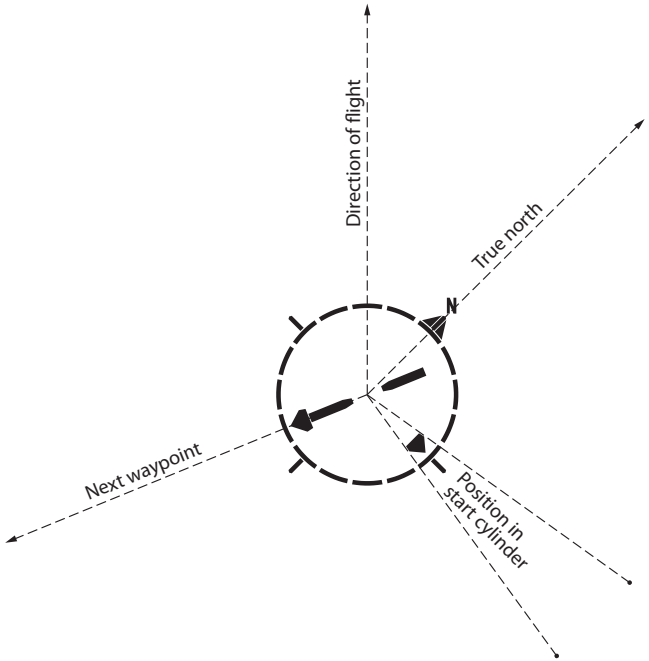


→)	You are inside the start cylinder
)←	You are outside the start cylinder

If you are on the wrong side of the cylinder, the symbol will flash. The page 7 display also gives you a countdown to the start time, your distance from the cylinder edge, and the speed over ground required to reach the cylinder at the start time.

If you are in the start cylinder, the compass rose will show you your position within the cylinder, and the direction to the next waypoint. If you are outside of the start cylinder, the compass rose will point the way back to it.

Compass Rose at Competition Start



The Element will give two separate notifications of a successful competition start:

- First, a tone sounds when the countdown timer reaches 00:00:00, meaning that the competition has begun.
- Second, a **Start OK** message will appear and a tone will sound when you cross the start gate correctly.

Multiple start gates

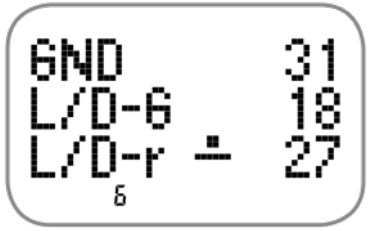
The Element will assume you want to take the first start gate and begin directing you toward the next waypoint once the start time countdown reaches zero. If you wish to skip a start gate and use then next one, you must enter the route menu and re-select the first waypoint. Then the Element will reactivate the start cylinder and reset the start time countdown according to the start gate interval you entered.

Flying the competition

The Element will guide you through the waypoints just like a normal route.

Final glide

The final glide to goal can make or break you in a competition. Be sure to use Flight Information Display Page 6 to judge if you have enough altitude to glide to goal. Page 6 shows you your current glide ratio along with the required glide ratio to reach the next waypoint at the saved waypoint altitude. If your L/D ratio is higher than required, you should reach goal. If you are under the required glide ratio, you need more altitude to reach goal. For more information about this display, see page **16**.



Adjustments and customisation

In this section:

Pilot information 27

Time zone (UTC) 27

Units of measurement 28

Coordinate format 28

Audio volume level 28

Variometer adjustments**Error! Bookmark not defined.**

Numeric vario averaging interval**Error! Bookmark not defined.**

Last thermal threshold**Error! Bookmark not defined.**

Turbulence filter 29

Climb audio menu 29
- *Climb threshold*
- *Climb frequency*
- *Frequency adjustment*
- *Pitch adjustment*
- *Pitch mode*
- *Near-thermal threshold*

Sink audio menu 29
- *Sink threshold*
- *Sink frequency*
- *Sink alarm threshold*

External wind vane sensor 29

Airspeed calibration 30

Stall alarm 30

Pilot information

You can enter your name, aircraft type, and aircraft ID number under this menu.

Note: see page **4** for a visual guide to help you with text entry.

Press and hold **MENU**, then use ▲▼ to select **Pilot**. Press **OK**.

Select a field to edit and press **OK**.

Spell out your information using ▲▼ to select the letters and **F1** / **F2** to move back and forth. Use **RTE** to toggle capital letters and special characters. Holding down **RTE** will also delete a character.

Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Time zone (UTC)

Your Element's time and date are automatically set by GPS, however you must input your time zone in the form of an offset from Coordinated Universal Time (UTC). To look up your UTC setting, use www.worldtimeserver.com and click on your country and city.

Press and hold **MENU**, then use ▲▼ to select **Instrument settings**.

Press **OK**.

Select **Time zone** and press **OK**.

Use ▲▼ to enter your UTC offset.

Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Units of measurement

The Element offers different units of measurement for altitude, speed, pressure, rate of climb/sink, distance, time, and coordinates. Default settings are in SI (metric) units. To select other units, follow these steps:

Press and hold **MENU**, then use ▲▼ to select **Instrument settings**.

Press **OK**.

Use ▲▼ to select **Units.** Press **OK**.

Use ▲▼ to select the unit to be changed**.** Press **OK**.

Now use ▲▼ to select your unit preference**.** Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Coordinate format

The Element uses the degrees decimal minutes format (dd° mm.mmm') as its default for GPS coordinates because it introduces fewer rounding errors. Selecting other formats may make your GPS less accurate, on the order of 20 metres. Follow the procedure above for changing units of measurement and select **Coordinates**.

The Element supports these coordinate formats:

dd° mm.mmm' (default)
dd° mm' ss"
dd.ddddd°
UTM (coming soon in a firmware update)

Audio volume level

Adjust your Element's audio volume using the 🔊 key. Pressing it repeatedly allows you to cycle through five audio levels. Audio level is indicated at the top of the display screen with the Audio Symbol.

Symbol	Level
	MUTE
🔈	25%
🔉	50%
🔊	75%
🔊	100%

Variometer adjustments

The Element vario is highly customisable. This section explains all the possible adjustments. Remember: when in doubt, use the default settings.

Numeric vario averaging interval

This value may be adjusted from 1 to 30 seconds. Though the default setting is 5 seconds, it may be useful to adjust the averaging interval to a longer setting. A good strategy is to set the numeric vario averaging interval to at least the time it takes you to turn a complete circle when thermalling: approximately 15 seconds or longer.

Press and hold **MENU**, then use ▲▼ to select **Vario settings**. Press **OK**.

Use ▲▼ to select **Integrated vario.** Press **OK**.

Use ▲▼ to select a value**.** Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Last thermal threshold

The Element records thermals using readings of its numeric vario. You can adjust the threshold of the last thermal value from between 0.1 to 3.0 m/s (or 0.2 to 6 ft/min x 100). The default setting is 0.5 m/s or (1.0 ft/min x 100).

Press and hold **MENU**, then use ▲▼ to select **Vario settings**. Press **OK**.

Use ▲▼ to select **Last thermal threshold.** Press **OK**.

Use ▲▼ to select a value**.** Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Turbulence filter

The Element has four sensitivity settings to filter turbulence so you get the most usable information from the instrument. The default setting is Level 1.

Setting	Filter amount	Appropriate conditions
0	Weak	Calm, winter flying
1	Normal	Normal flying, light turbulence
2	High	Turbulent thermals
3	Extreme	Very rough and strong thermals

Climb audio menu

Under this menu are numerous fine-tune adjustments you can make to your beeping climb tones. This section will explain them briefly. First, navigate to the Climb audio menu.

Press and hold **MENU**, then ▲▼ to select **Climb audio**.

Press **OK**.

From here, you will be given several items to adjust.

Climb threshold (default is 10 cm/s or 20 ft/min x 100)
This value sets how fast you must climb to start hearing the climb tone. The Element is so sensitive that on some days, such as when strong thermal cycles are coming up the hill, it may sound climb tones even while you are standing around preparing to launch. You can raise this value to prevent this.

Climb frequency (default is 800 Hz)
You can raise or lower the frequency of the lowest climb tone to hear overall higher or lower pitched beeps.

Frequency adjustment (default is 2)
The Element climb tones are set to raise in frequency the faster you climb. Some pilots enjoy hearing very excited, high-pitched tones from their varios—in which case they should choose a higher number for this setting. If you want a calmer vario in strong climbs, choose a lower value.

Pitch adjustment (default is 2)
The Element also beeps at a faster rate when you are climbing faster. Just like the frequency adjustment, if you want your vario to beep wildly, choose a higher number for this setting. If you want a calmer vario in strong climbs, choose a lower value.

Pitch mode (default is linear)
Choose linear or exponential for this setting, which matches the number of beeps per second to the rate of climb. Exponential will give a rapidly changing pitch from 0.0 - 2.0 m/s, then gradually increasing pitch in climbs from 2.0 - 10.0 m/s.

Near-thermal threshold (default is -0.5 m/s or -1.0 ft/min x 100)
This tone can be set from -1.0 to 0.0 m/s (or -2.0 to 0 ft/min x 100) and gives you notice that you are approaching a thermal.

Sink audio menu

Under this menu are adjustments you can make to your sink tones. Sink Alarm is also located in this menu. Navigate to the Sink audio menu:

Press and hold **MENU**, then use ▲▼ to select **Sink audio**.

Press **OK**.

From here, you will see three items to adjust.

Sink threshold (default is -0.5 m/s or -1.0 ft/min x 100)
This value sets how quickly you must be sinking in order to activate a sink tone.

Sink frequency (default is 600 Hz)
Adjust the frequency of the highest sink tone to hear overall lower or higher pitched sink tone.

Sink alarm threshold
Adjust the vario value at which your Element will sound the Sink Alarm, letting you know you are rapidly losing altitude.

External wind vane sensor

The Element can be connected to an external wind vane sensor, available for purchase from your vendor. Normally, the Element displays Ground Speed with the label **GND** shown on the screen, but when connected to a functioning airspeed sensor the label will change to **AIR** and the Element will display airspeed instead.

Airspeed calibration

Airspeed can be corrected +/-50% under the Speed menu. This could be useful if the shape of your pod harness is affecting your speed sensor's accuracy, for example.

Press and hold **MENU**, then use ▲▼ to select **Speed**. Press **OK**.

Use ▲▼ to select **Speed correction**. Press **OK**.

Use ▲▼ to enter your desired speed correction.

Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Stall alarm

Stall Alarm only functions when your Element is connected to an external sensor that provides it with airspeed data. When the Stall Alarm feature is activated, your Element will sound a loud tone if your airspeed drops below the Stall Alarm threshold. To activate or deactivate the Stall Alarm:

Press and hold **ALARM.**

Use ▲▼ to select **Stall**.

Confirm activating/deactivating the Stall Alarm by pressing **F1.**

Press **OK**.

Stall Alarm threshold can be set to any value from 15.0 to 99.9 km/h (or from 8.1 to 53.9 kts or from 9.3 to 62.0 mph).

Press and hold **MENU**, then use ▲▼ to select **Speed**. Press **OK**.

Use ▲▼ to select **Stall alarm**. Press **OK**.

Use ▲▼ to enter your desired airspeed for the Stall Alarm.

Press **OK**.

Press **ESC** to return to the Main Setup Menu.

Data management

In this section:

Recording interval (scan rate)	31
Record mode	31
Uploading flights to your computer	32
Deleting flights from your Element	32

Recording interval (scan rate)

While the Element updates its position every second using GPS, its default setting is to record every 10 seconds in order to manage tracklog file size. The record interval, called scan rate, is adjustable from between 1 to 30 seconds. At 1 second scan rate, your Element can record a single flight of up to 5.4 hours. Complete flights are then stored in the Element's general memory, which can hold 10,000 hours of flight time.

Press and hold **MENU**, then use ▲▼ to select **Flight memory**. Press **OK**.

Use ▲▼ to select **Scan rate**. Press **OK**.

Use ▲▼ to enter your desired value.

Press **OK**.

Press **ESC** to return to the Main Setup Menu.

We recommend you keep the scan rate between 5-10 seconds and manage the memory capacity by deleting flights from your Element once you have transferred the data to your computer. This scan rate range is especially important if you will be uploading your flights to an online contest site.

Record mode

The Element will default to automatic flight recording mode. You can disable automatic flight recording and choose manual recording mode. This could be useful if you wanted to record a hike-and-fly adventure, for instance, including your track while walking.

Press and hold **MENU**, then use ▲▼ to select **Flight memory**. Press **OK**.

Use ▲▼ to select **Record mode**. Press **OK**.

Use ▲▼ to select **Man**. Press **OK**.

Press **ESC** to return to the Main Setup Menu.

In manual mode, your Element will begin recording as soon as it acquires a GPS fix, indicated by the symbol **GPS 3D**. It will stop recording when you switch it off.

Reviewing flights on your Element

The most recent 50 flights are stored in chronological order on the Element and are available for review until you delete them. To review the summary of any flight, use the Flight Memory menu. The extended memory of your Element will hold additional flights, but they are only accessible using a USB connection.

Press and hold **MENU**, then use ▲▼ to select **Flight memory**. Press **OK**.

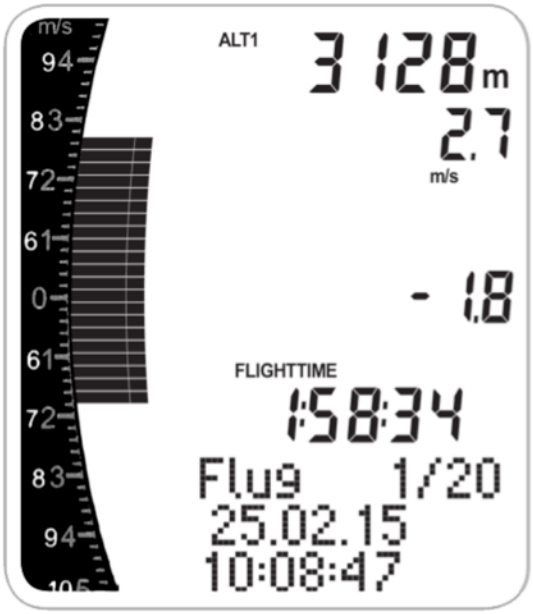
Use ▲▼ to select **Flights**. Press **OK**.

Use ▲▼ to select a flight.

Press **OK**.

Flight summary page:

- Maximum value of ALT1
- Maximum climb rate of the flight
- Maximum sink rate of the flight
- Total flight time
- Position in Element's memory
- Date
- Time of take-off



Uploading flights to your computer

The Element saves flight data automatically as IGC track files for online contests. (Coming soon, in a firmware update, tracklogs will also be saved as KML files for Google Earth.) Your Element works as a USB mass storage device, so when you connect it to your computer it will appear as an external hard drive.

Your track files are stored in a folder named **track**.

Switch off your Element.

Connect the Element to your computer with the USB cable.

Open the icon labelled **ELEMENT** on your computer.

Open the folder named **track.**

Drag-and-drop the tracklog files to your desktop.

Click **Eject** or **Disconnect Safely** before disconnecting your Element.

Warning: Your Element consumes battery power when in USB mode. Do not leave it connected to your computer for an extended period of time or you will drain your battery!

Warning: Always choose "Eject" on a Mac or "Disconnect Safely" on a PC before disconnecting your Element!

Deleting flights from your Element

Follow these steps to delete all flight data stored on your Element.

Press and hold **MENU**, then use ▲▼ to select **Flight memory**. Press **OK**.

Use ▲▼ to select **Delete**. Press **OK**.

Confirm **all flights Delete?** by pressing **OK**. Use **ESC** to cancel.

Firmware updates

In this section:

Installing a firmware update	33
Next update	34
Future updates	34

Flytec will periodically issue firmware updates for the Element to improve its functionality and offer new features. It is important to upgrade to the latest firmware version.

To see which firmware version your Element is running, switch it off and then switch it on again. The Element switch-on display shows battery test, device serial number, pilot's name, device name, and finally firmware version.

Visit element.flytec.ch to download the most current firmware version. Sign up for our newsletter at www.flytec.ch/nl to be notified of update releases.

Warning: Your Element consumes battery power when in USB mode. Do not leave it connected to your computer for an extended period of time or you will drain your battery!

Warning: be sure you have fresh batteries before installing new firmware! If your Element runs out of battery power while it is updating its firmware, it may not work properly.

Warning: Always choose "Eject" on a Mac or "Disconnect Safely" on a PC before disconnecting your Element!

Installing a firmware update

Because your Element works as a USB mass storage device, updating the firmware is fast and easy. When you connect it to your computer it will appear as an external hard drive. Download the new firmware in your language, then connect your Element, and drag-and-drop the **UPG** file into the folder named **update.**

Switch off your Element.

Connect the Element to your computer with the USB cable.

Open the icon labelled **ELEMENT** on your computer.

Open the folder named **update.**

Drag-and-drop the **UPG** file from your desktop into the folder **update.**

Click **Eject** or **Disconnect Safely** before disconnecting your Element.

Switch on your Element.

Confirm **Update?** by pressing **OK**.

Your Element will read the new firmware and automatically update itself. Note that this could take a few minutes. The firmware file remains in the **update** folder after the update, but its ending changes from **.upg** to **_pg.** If you change the ending back to **.upg**, your Element will offer to install it again the next time you switch it on. If multiple files with the ending **.upg** exist in the **update** folder, the Element will automatically choose only the newest one.

Next update

Early 2015 firmware releases will address these topics:

- Extend battery life
- Upload waypoints from files
- Store current position as waypoint

Future updates

Soon other firmware upgrades will give your Element even better capabilities:

- Airspace support
- Additional languages
- Optimised competition route
- Coordinates in UTM format
- AGL altitude (above ground level)
- Flight data export for Google Earth

Technical notes and support

In this section:

Batteries	35
Maintenance	35
Reboot	35
If exposed to water	35
Warranty	36
Technical support	36

Batteries

Your Element comes with two AA alkaline batteries. Battery life in normal use should exceed 30 hours. If you store your Element for long periods of time, remove the batteries to prevent corrosion.

If you choose to power your Element with **NiMH** rechargeable batteries, it is important to configure the power supply setting on the device.

Press and hold **MENU**, then use ▲▼ to select **Instrument settings**.

Press **OK**.

Use ▲▼ to select **Battery type** and press **OK**.

Use ▲▼ to select **NiMH 2.1Ah.** Press **OK**.

Press **ESC** to return to the Main Setup Menu.

We do not recommend using **NiCad** rechargeable batteries in the Element.

Maintenance

The Element is a sensitive instrument–handle it gently. Always store it in its cloth bag when not in use, and only wipe it clean with a soft, damp cloth. Never expose the Element to extreme temperatures, water, or mechanical force.

Reboot

In the event your Element locks up, you may perform a hard reboot by removing the batteries for 5 minutes before replacing them and restarting the device.

If exposed to water

The Element is not water resistant! Exposure to water or any other liquid will cause serious damage. In case your Element gets wet, remove the batteries immediately to prevent more damage. If your Element was exposed to salt water, rinse it in warm, clean, fresh water.

Dry your Element thoroughly and return it to your vendor or directly to Flytec for servicing.

Warranty

Flytec provides a 2-year warranty on all our flight instruments, and we encourage you to contact us via our website any time for support. After your warranty has expired we will still repair your Element at a reasonable charge.

Technical support

Please direct all inquiries to your vendor, or directly to Flytec via our website flytec.ch.

Specifications

Altimeter

Range:	0 to 12,300 m
Resolution	1 m or 1 ft
Scale:	m or ft
QNH:	Air pressure in hPa or inHg
ALT1:	Absolute altitude
ALT2:	Absolute or relative altitude
ALT3:	Differential altitude or AGL (coming soon)

Variometer

Units: m/s or ft/min x 100

Graphic display

Range:	±10 m/s or ±20 ft/min x 100
Resolution:	0.2 m/s or 0.4 ft/min x 100

Digital display

Range:	±300 m/s or ±600 ft/min x 100
Scale:	0.1 m/s or 0.1 ft/min x 100
Integrator:	Adjustable from 1 to 30 sec

Acoustics

Volume: 4 volume settings
All base frequencies and modulations can be modified

Climb acoustics

Tone and interval modulation with selectable lower threshold
Maximum interval frequency threshold: automatic (smart interval) or manual selection from 3 to 11 m/s

Sink acoustics

Discreet near-thermal tone with selectable lower threshold
Discreet sink tone with selectable upper threshold
Loud sink alarm with selectable upper threshold
Stall alarm (with optional external airspeed sensor)

GPS

Channels:	48
Update rate:	1 Hz, independent of selected recording interval

Airspeed measurement
(with optional external sensor)

Range:	0 km/h up to 120 km/h
Units:	km/h, kts, or mph
Resolution:	1 km/h, 1 kt, or 1 mph
Adjustments:	±50%

Connectivity

Connection:	Micro-USB cable, data exchange through file copy
Compatibility:	Mass storage, compatible with Windows, Mac OS X, Linux, Android and iOS (through OTG cable)

Recording

Flights:	50 flights with start time/date, flight duration, maximum altitude, maximum climb rate, maximum sink rate
Recording interval:	1 s to 60 s
Memory capacity:	Extended data storage for 10,000 hours of flight time
Flight data file formats:	IGC (.igc), Google Earth (.kml, coming soon)

Waypoints

Capacity:	250 waypoints
Entry:	Store current position, manual entry, Coming soon: load waypoints from file
Coordinate formats:	dd°mm.mmm', dd°mm'ss", dd.ddddd°. Coming soon: UTM
File formats:	CompeGPS (.wpt), GEO (.wpt), Ozi Explorer (.wpt), SeeYou (.cup), GPX (.gpx)

Routes

Capacity:	1 route with up to 50 waypoints
Entry:	Selection from waypoints list
Competition route:	Start time, number of start gates, start gate interval time

Competition Support

Standard:	Competition route (guided through cylinder centres)
Advanced:	Optimised competition route (coming soon)

Airspace support
(coming soon)

Distance and direction to nearest restricted airspace
Proximity warning of restricted airspace
Nearest exit of restricted airspace

Miscellaneous

Dimensions:	138 x 74 x 23 mm
Weight:	178 g (including batteries, without mount)
Power supply:	2 AA alkaline batteries or NiMH accumulators
Operating time:	30 hours (approximately)
Charge state:	Continuously monitored battery voltage, with indicator
Operating temp:	-10 °C to 50 °C
Storage temp:	-30 °C to 70 °C
Languages:	English, German, French (additional languages coming soon)
Warranty:	24 months